

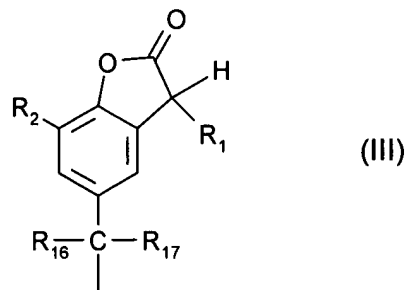
and

if n is 2,

R_1 is unsubstituted or C_1 - C_4 alkyl- or hydroxy-substituted phenylene or naphthylene; or is $-R_{12}-X-R_{13}-$, R_2 , R_3 , R_4 and R_5 independently of one another are hydrogen, chlorine, hydroxyl, C_1 - C_{25} alkyl, C_7 - C_9 phenylalkyl, unsubstituted or C_1 - C_4 alkyl-substituted phenyl; unsubstituted or C_1 - C_4 alkyl-substituted C_5 - C_8 cycloalkyl; C_1 - C_{18} alkoxy, C_1 - C_{18} alkylthio, C_1 - C_4 alkylamino, di(C_1 - C_4 alkyl)amino, C_1 - C_{25} alkanoyloxy, C_1 - C_{25} alkanoylamino, C_3 - C_{25} alkenoyloxy, C_3 - C_{25} alkanoyloxy which is interrupted by

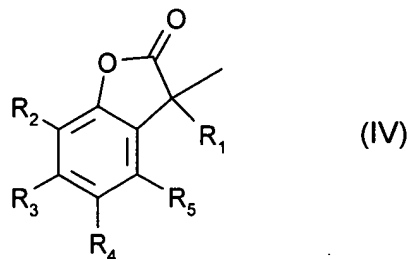
oxygen, sulfur or $\text{>N}-R_{14}$; C_6 - C_9 cycloalkylcarbonyloxy, benzoyloxy or C_1 - C_{12} alkyl-substituted

benzoyloxy; or else the radicals R_2 and R_3 or the radicals R_3 and R_4 or the radicals R_4 and R_5 , together with the carbon atoms to which they are attached, form a benzo ring, R_4 is additionally $-(CH_2)_p-COR_{15}$ or $-(CH_2)_qOH$ or, if R_3 , R_5 and R_6 are hydrogen, R_4 is additionally a radical of the formula III



in which R_1 is defined as indicated above for $n = 1$,

R_6 is hydrogen or a radical of the formula IV



where R_4 is not a radical of the formula III and R_1 is defined as indicated above for $n = 1$,

R₇, R₈, R₉, R₁₀ and R₁₁ independently of one another are hydrogen, halogen, hydroxyl, C₁-C₂₅alkyl, C₂-

C₂₅alkyl interrupted by oxygen, sulfur or >N-R_{14} ; C₁-C₂₅alkoxy, C₂-C₂₅alkoxy interrupted by

oxygen, sulfur or >N-R_{14} ; C₁-C₂₅alkylthio, C₃-C₂₅alkenyl, C₃-C₂₅alkenyloxy, C₃-C₂₅alkynyl, C₃-

C₂₅alkynyloxy, C₇-C₉phenylalkyl, C₇-C₉phenylalkoxy, unsubstituted or C₁-C₄alkyl-substituted phenyl;

unsubstituted or C₁-C₄alkyl-substituted phenoxy; unsubstituted or C₁-C₄alkyl-substituted C₅-

C₈cycloalkyl; unsubstituted or C₁-C₄alkyl-substituted C₅-C₈cycloalkoxy; C₁-C₄alkylamino, di(C₁-

C₄alkyl)amino, C₁-C₂₅alkanoyl, C₃-C₂₅alkanoyl interrupted by oxygen, sulfur or >N-R_{14} ;

C₁-C₂₅alkanoyloxy, C₃-C₂₅alkanoyloxy interrupted by oxygen, sulfur or >N-R_{14} ;

C₁-C₂₅alkanoylamino, C₃-C₂₅alkenoyl, C₃-C₂₅alkenoyl interrupted by oxygen, sulfur or >N-R_{14} ;

C₃-C₂₅alkenoyloxy, C₃-C₂₅alkenoyloxy interrupted by oxygen, sulfur or >N-R_{14} ; C₆-

C₉cycloalkylcarbonyl, C₆-C₉cycloalkylcarbonyloxy, benzoyl or C₁-C₁₂alkyl-substituted benzoyl;

benzoyloxy or C₁-C₁₂alkyl-substituted benzoyloxy; $\text{—O—}\overset{\overset{\text{R}_{18}}{|}}{\underset{\underset{\text{R}_{19}}{|}}{\text{C}}}\text{—}\overset{\overset{\text{O}}{||}}{\text{C}}\text{—R}_{15}$ or

$\text{—O—}\overset{\overset{\text{R}_{20}}{|}}{\underset{\underset{\text{H}}{|}}{\text{C}}}\text{—}\overset{\overset{\text{R}_{21}}{|}}{\underset{\underset{\text{R}_{22}}{|}}{\text{C}}}\text{—O—R}_{23}$, or else, in formula II, the radicals R₇ and R₈ or the radicals R₈ and R₁₁,

together with the carbon atoms to which they are attached, form a benzo ring,

R₁₂ and R₁₃ independently of one another are unsubstituted or C₁-C₄alkyl-substituted phenylene or naphthylene,

R₁₄ is hydrogen or C₁-C₈alkyl,

R₁₅ is hydroxyl, $\left[\text{—O}^- \frac{1}{r} \text{M}^{r+}\right]$, C₁-C₁₈alkoxy or $\text{—N}\begin{matrix} \text{R}_{24} \\ \text{R}_{25} \end{matrix}$,

R₁₆ and R₁₇ independently of one another are hydrogen, CF₃, C₁-C₁₂alkyl or phenyl, or R₁₆ and R₁₇, together with the C atom to which they are attached, form a C₅-C₈cycloalkylidene ring which is unsubstituted or substituted from 1 to 3 times by C₁-C₄alkyl;

R₁₈ and R₁₉ independently of one another are hydrogen, C₁-C₄alkyl or phenyl,

R₂₀ is hydrogen or C₁-C₄alkyl,

R₂₁ is hydrogen, unsubstituted or C₁-C₄alkyl-substituted phenyl; C₁-C₂₅alkyl, C₂-C₂₅alkyl interrupted by

oxygen, sulfur or >N-R_{14} ; C₇-C₉phenylalkyl which is unsubstituted or substituted on the phenyl

radical from 1 to 3 times by C₁-C₄alkyl; C₇-C₂₅phenylalkyl which is unsubstituted or substituted on the

phenyl radical from 1 to 3 times by C₁-C₄alkyl and interrupted by oxygen, sulfur or >N-R_{14} , or

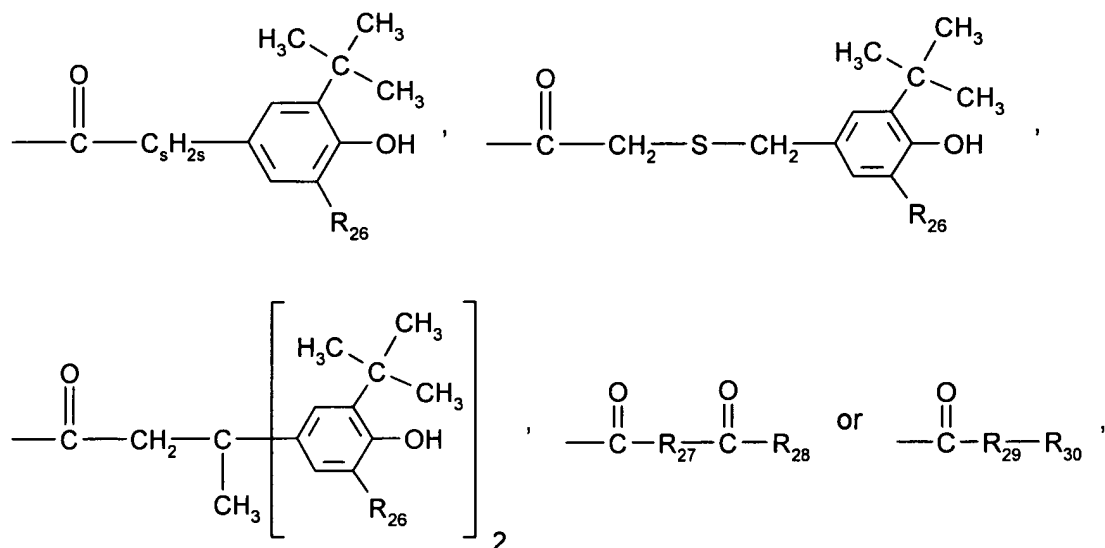
else the radicals R₂₀ and R₂₁, together with the carbon atoms to which they are attached, form a C₅-C₁₂cycloalkylene ring which is unsubstituted or substituted from 1 to 3 times by C₁-C₄alkyl;

R₂₂ is hydrogen or C₁-C₄alkyl,

R₂₃ is hydrogen, C₁-C₂₅alkanoyl, C₃-C₂₅alkenoyl, C₃-C₂₅alkanoyl interrupted by oxygen, sulfur or

>N-R_{14} ; C₂-C₂₅alkanoyl substituted by a di(C₁-C₆alkyl)phosphonate group;

C₆-C₉cycloalkylcarbonyl, thenoyl, furoyl, benzoyl or C₁-C₁₂alkyl-substituted benzoyl;



R₂₄ and R₂₅ independently of one another are hydrogen or C₁-C₁₈alkyl,

R₂₆ is hydrogen or C₁-C₈alkyl,

R_{27} is a direct bond, C_1 - C_{18} alkylene, C_2 - C_{18} alkylene interrupted by oxygen, sulfur or $\diagup N-R_{14}$; C_2 -

C_{18} alkenylene, C_2 - C_{20} alkylidene, C_7 - C_{20} phenylalkylidene, C_5 - C_8 cycloalkylene, C_7 - C_8 bicycloalkylene,

unsubstituted or C_1 - C_4 alkyl-substituted phenylene, or  or  ,

R_{28} is hydroxyl, $\left[-O^- \frac{1}{r} M^{r+} \right]$, C_1 - C_{18} alkoxy or $-N \begin{matrix} R_{24} \\ R_{25} \end{matrix}$,

R_{29} is oxygen, -NH- or $\diagup N \begin{matrix} O \\ || \end{matrix} C-NH-R_{30}$,

R_{30} is C_1 - C_{18} alkyl or phenyl,

R_{31} is hydrogen or C_1 - C_{18} alkyl,

M is an r-valent metal cation,

X is a direct bond, oxygen, sulfur or $-NR_{31}-$,

n is 1 or 2,

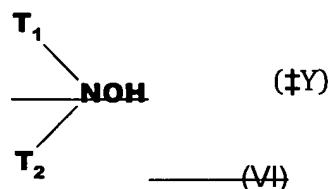
p is 0, 1 or 2,

q is 1, 2, 3, 4, 5 or 6,

r is 1, 2 or 3, and

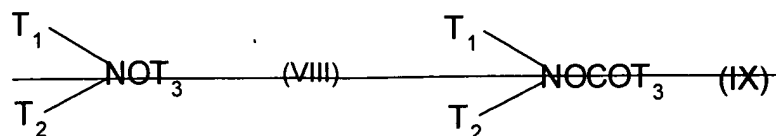
s is 0, 1 or 2;

~~(ii) a long chain N,N-dialkylhydroxylamine of formula (VI)~~



~~wherein T_1 and T_2 are independently straight or branched chain alkyl of 6 to 36 carbon atoms;~~

~~(iii) substituted hydroxylamines may be for example of the formula (VIII) or (IX)~~



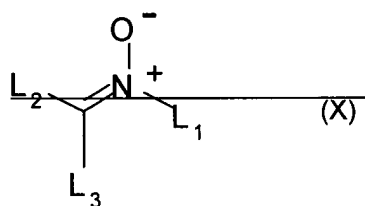
wherein

— ~~T₄ is straight or branched chain alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aralkyl of 7 to 9 carbon atoms, or said aralkyl substituted by one or two alkyl of 1 to 12 carbon atoms or by one or two halogen atoms;~~

— ~~T₂ is hydrogen, or independently has the same meaning as T₄;~~ and

— ~~T₃ is allyl, straight or branched chain alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 18 carbon atoms, cycloalkenyl of 5 to 18 carbon atoms or a straight or branched chain alkyl of 1 to 4 carbon atoms substituted by phenyl or by phenyl substituted by one or two alkyl groups of 1 to 4 carbon atoms or by 1 or 2 halogen atoms;~~

(iv) — ~~nitrones of the formula (X)~~



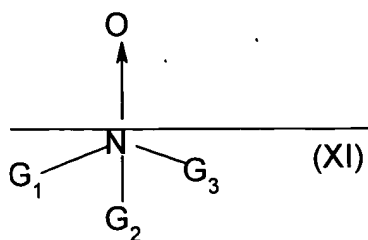
— wherein

— ~~L₄ is straight or branched chain alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aralkyl of 7 to 9 carbon atoms, or said aralkyl substituted by one or two alkyl of 1 to 12 carbon atoms or by one or two halogen atoms;~~

— ~~L₂ and L₃ are independently hydrogen, straight or branched chain alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aralkyl of 7 to 9 carbon atoms, or said aralkyl substituted by one or two alkyl of 1 to 12 carbon atoms or by one or two halogen atoms;~~

— ~~or L₁ and L₂ together form a five or six membered ring including the nitrogen atom; and~~

(v) ~~amine oxides are for example saturated tertiary amine oxides as represented by general formula (XI):~~



~~wherein~~

~~G₁ and G₂ are independently a straight or branched chain alkyl of 6 to 36 carbon atoms, aryl of 6 to 12 carbon atoms, aralkyl of 7 to 36 carbon atoms, alkaryl of 7 to 36 carbon atoms, cycloalkyl of 5 to 36 carbon atoms, alkylcycloalkyl of 6 to 36 carbon atoms or cycloalkylalkyl of 6 to 36 carbon atoms;~~

~~G₃ is a straight or branched chain alkyl of 1 to 36 carbon atoms, aryl of 6 to 12 carbon atoms, aralkyl of 7 to 36 carbon atoms, alkaryl of 7 to 36 carbon atoms, cycloalkyl of 5 to 36 carbon atoms, alkylcycloalkyl of 6 to 36 carbon atoms or cycloalkylalkyl of 6 to 36 carbon atoms; with the proviso that at least one of G₁, G₂ and G₃ contains a β carbon-hydrogen bond; and~~

~~wherein said aryl groups may be substituted by one to three halogen, alkyl of 1 to 8 carbon atoms, alkoxy of 1 to 8 carbon atoms or combinations thereof; and~~

~~wherein said alkyl, aralkyl, alkaryl, cycloalkyl, alkylcycloalkyl and cycloalkylalkyl groups may be interrupted by one to sixteen O, S, SO, SO₂, COO, OCO, CO, NG₄, CONG₄ and NG₄CO groups, or wherein said alkyl, aralkyl, alkaryl, cycloalkyl, alkylcycloalkyl and cycloalkylalkyl groups may be substituted by one to sixteen groups selected from OG₄, SG₄, COOG₄, OCOG₄, COG₄, N(G₄)₂, CON(G₄)₂, NG₄COG₄ and 5- and 6-membered rings containing the C(CH₃)(CH₂R_x)NL(CH₂R_x)(CH₃)C group or wherein said alkyl, aralkyl, alkaryl, cycloalkyl, alkylcycloalkyl and cycloalkylalkyl groups are both interrupted and substituted by the groups mentioned above; and~~

~~wherein~~

~~G₄ is independently hydrogen or alkyl of 1 to 8 carbon atoms;~~

~~R_x is hydrogen or methyl;~~

~~L is hydrogen, hydroxy, C₁₋₃₀-straight or branched chain alkyl moiety, a C(O)R moiety where R is a C₁₋₃₀-straight or branched chain alkyl group, or a OR_y moiety; and~~

~~R_y is C₁₋₃₀-straight or branched chain alkyl, C₂-C₃₀-alkenyl, C₂-C₃₀-alkynyl, C₅-C₁₂-cycloalkyl, C₆-C₁₀-bicycloalkyl, C₆-C₈-cycloalkenyl, C₆-C₁₀-aryl, C₇-C₉-aralkyl, C₇-C₉-aralkyl substituted by alkyl or aryl, or CO(D), where D is C₄-C₁₈-alkyl, C₄-C₁₈-alkoxy, phenyl, phenyl substituted by hydroxy, alkyl or alkoxy, or amino or amino mono- or di-substituted by alkyl or phenyl; wherein said edible organic substance is selected from the group consisting of potato flakes, bakery products, meat~~

emulsions, precooked cereals, instant noodles, soybean milk, chicken products, sausage, mayonnaise, margarine, frozen fish, frozen pizza and cheese.

2. (original). The composition of claim 1 wherein the benzofuranone is at least one compound of formula I wherein $n = 1$, R_1 is phenyl which is unsubstituted or substituted in para-position by C_1 - C_{18} alkylthio or di(C_1 - C_4 alkyl)amino; mono- to penta-substituted alkylphenyl containing together a total of at most 18 carbon atoms in the 1 to 5 alkyl substituents; naphthyl, biphenyl, terphenyl, phenanthryl, anthryl, fluorenyl, carbazoyl, thienyl, pyrrolyl, phenothizinyll or 5,6,7,8-tetrahydronaphthyl, each of which is unsubstituted or substituted by C_1 - C_4 alkyl, C_1 - C_4 alkoxy, C_1 - C_4 alkylthio, hydroxy or amino.

3. (original). The composition of claim 1 wherein the benzofuranone is a compound of formula I wherein n is 2, R_1 is $-R_{12}-X-R_{13}-$, R_{12} and R_{13} are phenylene, X is oxygen or $-NR_{31}-$, and R_{31} is C_1 - C_4 alkyl.

4. (original). The composition of claim 1 wherein the benzofuranone is at least one compound selected from the group consisting of 3-[4-(2-acetoxyethoxy)phenyl]-5,7-di-tert-butyl-benzofuran-2-one; 5,7-di-tert-butyl-3-[4-(2-stearoyloxyethoxy)phenyl]benzofuran-2-one; 3,3'-bis[5,7-di-tert-butyl-3-(4-[2-hydroxyethoxy]phenyl)benzofuran-2-one]; 5,7-di-tert-butyl-3-(4-ethoxyphenyl)benzofuran-2-one; 3-(4-acetoxy-3,5-dimethylphenyl)-5,7-di-tert-butylbenzofuran-2-one; 3-(3,5-dimethyl-4-pivaloyloxyphenyl)-5,7-di-tert-butyl-benzofuran-2-one; 5,7-di-tert-butyl-3-phenylbenzofuran-2-one; 5,7-di-tert-butyl-3-(3,4-dimethylphenyl)-benzofuran-2-one; 5,7-di-tert-butyl-3-(2,3-dimethylphenyl)benzofuran-2-one.

5-13. (cancelled).

14. (currently amended). The composition of claim 1 wherein the antioxidant of component (i) is present in an amount of from about 0.005% by weight to about 5% by weight, based on the weight of the edible organic substance.

15. (currently amended). The composition of claim 1 wherein the antioxidant of component (i) is present in an amount of from about 0.01% by weight to about 1% by weight, based on the weight of the edible organic substance.

16. (original). The composition of claim 1 wherein the composition further comprises additional food additives selected from food antioxidants in addition to those specified in claim 1, emulsifiers, suspension agent and colorings.

17. (original). The composition of claim 1 wherein the composition further comprises food antioxidants selected from the group consisting of butylated hydroxytoluene, butylated hydroxyanisole, tocopherol, ascorbic acid, benzylphosphonates, esters of b-(3,5-di-tert-butyl-4-hydroxyphenyl)propionic acid with mono- or polyhydric alcohols, esters of b-(5-tert-butyl-4-hydroxy-3-methylphenyl)propionic acid with mono- or polyhydric alcohols, esters of b-(3,5-dicyclohexyl-4-hydroxyphenyl)propionic acid with mono- or polyhydric alcohols, esters of 3,5-di-tert-butyl-4-hydroxyphenyl acetic acid with mono- or polyhydric alcohols, phosphites and phosphonites.

18. (cancelled).

19. (original). The composition of claim 1 wherein the edible organic substance is a food containing fatty acid glycerides, edible fats and fatty oils.

20. (original). The composition of claim 1 wherein the edible organic substance is a pet food or animal feed.